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# NOTES.

## RECENT DISCUSSIONS OF IMITATION.

Psychology and sociology have been approaching each other of late years in a manner which is very interesting to the students of both sciences. The former has discovered that the study of the individual mind is incomplete, if pursued without considering the enormous influence of the social atmosphere; while sociology has realized that the primary material of all social development must consist of processes which take place in the individual consciousness. To this rapprochement of the two sciences nothing has contributed more than the discussion and development of the concept of imitation, a discussion whose leaders have been M. Tarde in sociology and Professor Baldwin in psychology. The present writer has no ambition to add anything to current thought on this very important subject, but a brief résumé of the chief applications which the thought of imitation has thus far found, may be of service to those readers of the REVIEW who have lacked time to pursue the subject for themselves.

To begin with, one must distinguish a broader and a narrower sense of the term 'imitation.' For Tarde, as a sociologist, the fact of imitation itself is accepted without analysis ; he is concerned purely with its function as a social phenomenon. Imitation, as he regards it, means simply the fact that a certain state of mind existing in the consciousness of one individual tends to 'propagate itself' in the minds of those persons with whom he is brought into contact. This of course is a social phenomenon. Baldwin, on the other hand, as a psychologist, undertakes to analyze the above mentioned fact, and is led in the course of this analysis to extend the meaning of the term imitation to include phenomena that have, strictly speaking, nothing social about them; that are, as Tarde would say, purely vital. For it is evident that the process by which one man imitates another's mental states must be in the first instance an imitation of that other's bodily movements, since these alone are directly accessible to observation. But imitating the movements of another person, which is a social phenomenon, does not differ, regarded psychologically, from imitating any external stimulus whatever, one, for instance, that proceeds from an inanimate object, though the latter process has no direct social significance. And imitating a stimulus means moving so as to reproduce the stimulus. Therefore Professor Baldwin extends the term imitation to cover any motor process that reproduces the stimulus, of whatever character, which originated it.

Bearing in mind, then, these two applications of the term, the one restricted to imitation of persons, the other extended to imitation or reproduction of any kind of stimulus, we find that the conception is claimed to be fruitful in at least four different fields of thought: biological, psychological, ethical, and sociological.

I. As regards biology, Professor Baldwin suggests (1) that the imitative form of reaction is the original and primitive form. He refers here to the cell theory of Max Verworn, according to which the outer layer of molecules in a mass of protoplasm, acted upon by the oxygen at the surface, liberates elements which combine with those at the nucleus, setting free other elements which are again drawn to the surface through their affinity for oxygen—the protoplasmic movement being thus essentially a form of movement which reproduces its own stimulus. (2) Professor Baldwin further holds that the imitative or stimulus-repeating action is a very important factor in development. Described in general biological terms, an imitative reaction occurs when, under a stimulus of such a character as to produce excess of energy in the organism, this excess is discharged in movements which tend to prolong or repeat the stimulus. Now, if there were not such an arrangement for securing repetition of stimuli, the formation of new habits, and hence development, on the part of the organism, would be practically impossible, for the repetition of a new stimulus, upon which adaptation depends, would be a mere accident of environment.

II. Psychologically, the two most important applications of the conception of imitation concern the conscious processes accompanying movement, and the development of self-consciousness. (1) Professor Baldwin attempts to show that imitation is the fundamental fact in consciously directed movement; that, as he puts it, "every intelligent action is stimulated by imitative copies whose presence the action in question tends to maintain or to suppress." When an action seems to lack the imitative character, that is because the 'copy' is a purely mental one called up by association, instead of an external one actually perceived. We do not ordinarily say that the child 'imitates' the taste of a peach when it grasps and bites one, but the memory of the taste is present as a stimulus to action, and the movement results in a repetition of this stimulus; hence, it may be said to belong to the imitative type. Since Professor Baldwin considers the motor aspect of such processes as recognition, attention, and the formation of concepts to be their essential feature, it will be seen that, in making imitation the basis of all intelligent action, he is putting it at the foundation of mental life. (2) When we come to imitation as a factor in the development of self-consciousness, it is imitation in the narrower, purely social sense that we have to deal with—where the copy reproduced is not any stimulus whatever, but the movements of some person. Professor Baldwin shows very clearly that the individual in the early stages of his development adds to his stock of experience largely by imitating the movements of surrounding persons, and attributes to these persons mental states similar to those produced in him by the imitative movements; that thus his sense of self and his sense of other selves develop simultaneously; that, in fact, the concept of self is a true concept, which the individual applies from the outset alike to his own self and to all other individuals whose behavior he can interpret by imitation.

III. This leads us to the first of the two most important ethical applications of the imitative principle. These are, first, a kind of "reconciliation of egoism and altruism," and, second, the introduction of an influential factor, 'social heredity,' into the discussion of moral development. (1) Since, as we have just seen, the thought of self is essentially generic, not particular, it follows that whatever is predicated of my self is, *ipso facto*, predicated of any other self, and *vice versa*. For the identity of the thought of ego and the thought of alter, with all its moral significance, imitation is largely responsible. (2) In the second place, imitation is the great means by which the existing moral code of society reproduces itself in each new individual. The result of 'social heredity' is the moral equipment which the individual acquires through imitation from surrounding society, and social heredity, when given its due importance, renders the Spencerian hypothesis of actual biological inheritance of moral instincts much less necessary to explain the progress of morality.

IV. We come now to the sociological aspect of imitation, which has been so fully discussed by M. Tarde. Briefly, imitation, in the narrower or social sense, is regarded as, first, the function which constitutes the essence of a society, and, second, the function which renders social progress possible. (1) A society is an aggregate of persons who think and act alike along certain general lines. One individual regards another as a fellow member of society, only if he expects from him thoughts and actions similar to those which he himself would have and do in the same circumstances. Now the source of similarity in thought and behavior is to be found in imitation. (2) Secondly, it is by means of imitation that new ways of thinking and acting spread and gradually alter the whole character of a society. This idea might seem sufficiently obvious, but it has been reserved for M. Tarde to make a careful study of the laws which govern the spread of imitative currents in the social medium, the interferences of these currents and their mutual modifications. These last are the source of inventions, which, originating in the mind of some exceptionally endowed individual, set new copies for society to imitate. To the question: "What is it that is imitated?" Tarde answers, "Beliefs and desires;" "Baldwin, Thoughts." The difference is insignificant, for beliefs and desires represent that aspect of thoughts which bears immediately upon action, and hence is most important with reference to imitation. Professor Baldwin, by the way, errs in stating ['Social and Ethical Interpretations,' p. 479] that M. Tarde gives no answer to the question, 'What is imitable?' until his later work, *La logique sociale*: he considers the point on pp. 163 ff. of *Les lois d'imitation*.

The concept of imitation has not escaped discussion from the metaphysical standpoint. M. Tarde is impressed with the analogy between the three great forms of 'Repetition:' undulation in physics, heredity in biology, and imitation in sociology; and with the fact that in these three sciences, which cover the phenomenal world, the laws of phenomena may be generalized under the three heads of Repetition, Opposition, and Adaptation. He advances the hypothesis, contrary to the orthodox evolutionary theory, that heterogeneity is the primitive state of the universe, and that the homogeneous is a product of repetition and adaptation. Again, Professor Royce [PHILOSOPHICAL REVIEW, IV, 5, 6] makes imitation a link in the chain of argument by which he answers the question as to what kind of real existence we may attribute to nature. He reasons that, since the only kind of real and independent existence of which we have direct evidence is that of other people's minds, in which we believe because we can interpret by imitation the movements of the bodies by which those minds are phenomenally manifest to us, therefore we should attribute this kind of reality to other natural objects, and regard the world of inanimate nature as a world of conscious experience independent of ourselves, which is not a social world for us simply because we cannot imitate it as we do our fellow creatures.

So manifold are the directions in which the thought of imitation has shown its applicability. Time will doubtless make it apparent that some of these applications are much more important than others. The "social and ethical interpretations" of imitation, for example, seem to have vastly more value for sociology and ethics, than the biological and strictly psychological aspects of the conception have for biology and psychology. In short, one might say that imitation in the narrower, social sense is a thought of more fruitfulness, one which solves or casts light on more problems; than the wider conception of imitation which makes it a biological term.

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## CURRENT DISCUSSIONS OF PSYCHOLOGY AND EDUCATION.

That psychology is a science will, I suppose, be admitted even by modern Jeremiahs who sit in ashes, lamenting its limitations and its unfruitful alliance with pedagogy; just as little will the practical aspect of education be denied. So far, then, as psychology is theory, and education practice, there can be no doubt of the general direction of dependence. In regard to the dependency itself, it seems useless to raise a question. The application of psychological results to the practice of teaching, is just as natural and inevitable as the application of physical and chemical knowledge to physiology, or of physiological knowledge to medicine, or of the principles of constitutional law to statecraft. The objection that the psychologist is not necessarily an educator, affects the matter as little as a similar statement, that the physiologist is not a physician, affects the value of physiology to medicine.

On the other hand, the question of the applicability of teaching methods and their results to psychology does not admit of so categorical an answer.

The evaluation of such material will have to be left to the psychologist, since he alone is supposed to know his own science. The fact that its value for psychology has been closely questioned does not give the subject general interest outside the psychological laboratory and study.[1] So far as it implies a return to education, as the result of psychological study of the child, it falls under the head of educational benefits from psychology, and will be noticed later. It is to be remarked that 'child psychology' is not a thing *sui generis*, but a particular province of psychology at large.

The main question in this connection, then, concerns the value of psychological methods and results to education. Recent attempts to answer this have complicated the problem by raising a previous question, namely: the validity of psychological methods themselves. The inference has been drawn that a superannuated or unsound psychology offers a poor basis for education. Thus, for example, the statement of a noted educator that "the interest in Herbart's psychology is to-day based almost wholly upon its application in education [2]" has provoked the query, "since it is antiquated as psychology, may it be depended upon as a psychologic foundation to education?" Similarly Professor Münsterberg's warning [3] against experimental psychology gives us pause in estimating the utility of its methods for teaching. In discussing the dangers from psychology, the writer just named lays it down that the teacher is unwise to coquette with experimental psychology; for experimental psychology professes to be quantitative, and mental facts are only qualitative. Now the cry that psychology deals exclusively with unmeasurable terms has been raised too many times to cause much of a flutter of excitement within psychology itself. It is not, however, a common sight to see an acknowledged Samson eager to unpillar his own science without first quitting its shadows.

Inasmuch as Professor Münsterberg's attack seemed to offer an excuse for closing certain avenues of communication between the psychological and the educational worlds, his articles have attracted notice from several directions. Discussion of the subject at this time is further explainable from the fact that widespread cogitation of very serious problems relating to psychology and pedagogy had laid a train which only needed the spark to set it off. Let us follow the trend of discussion. Professor Bliss, of the New York School of Pedagogy, writing from the standpoint of practice, denies that the relations of psychology and pedagogy need the prophesy of the alarmist.[4] He defines a territory within which he finds signal aid coming to the teacher through psychology. Professor Cattell, continuing the argument,[1] dissents entirely from the main theses of the *Atlantic Monthly* articles. These are: (1) That mental processes cannot be measured; and (2) that experimental psychology is useless to the teacher. If the first thesis, he says, were true, the charge of inconsistency might well be brought against Münsterberg, who has himself written of 'Zeitsinn,' 'Augenmass' and 'Psychometric Investigations.'[2] In regard to the second point, Professor Cattell writes: "The experimental study of the senses, of memory, attention, habit, fatigue, etc., has enriched psychology in a direction of special interest to pedagogy. The practical applications are limited, but we hope that they will increase, and in the meanwhile the subject is profitable and stimulating to the teacher." A similar, though perhaps less radical, statement is made by Professor DeGarmo from the educational standpoint:[3] "It would be no greater error," he says, "to affirm that the chief need of all the half-educated teachers of the United States is a course in experimental psychology, than to make the equally extravagant statement, that psychology of whatever kind is valueless to the teacher directly."

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[1] Cf. Professor Baldwin on child study, *Psychological Review*, March, 1898, p. 218, also references which he gives.

[2] Nicholas Murray Butler, *Psychological Review*, I, 82.

[3] *Atlantic Monthly*, February and June, 1898. Cf. Preface to Münsterberg's pamphlet, *Psychological Laboratory of Harvard University*, 1893: "With an increasing recognition that the results of experimental psychology are important, not only to psychologists and philosophers, but also to teachers and physicians, there is a growing desire for new laboratories."

[4] *Forum*, April, 1898.

Once more, in regard to 'quantitative' psychology as contrasted by Professor Münsterberg with 'qualitative,' or analytic psychology, Professor Titchener points out that mental contents are measureable at least so far as they can be treated as 'function,' as capacity; and it is just this kind of psychological treatment, he believes, that offers most to the teacher. Ebbinghaus's work on memory, and on fatigue among the school children of his own city, would, I suppose, be fair samples. Still, this is a question for psychology, and has only been brought into the present discussion by force. Time has happily relieved psychology of further defence of its presuppositions and methods, by bringing a more moderate statement from the Harvard Laboratory, in which Professor Münsterberg concedes that psychology is dangerous only to the teacher, and not to education itself.[5] Education *as science* ought to make the freest use of psychology. Quite a different standpoint! If experimental psychology is working on a wrong basis, on false assumptions, one wonders why education should recognize it under any conditions. Either it is dangerous to the teacher because its basis and methods are questionable (first position); or its position is justified[1] and its application to educational needs rests upon other grounds than fitness (second position). It seems fairer to the attacking party to judge him by his later and perhaps more deliberate utterances; at the same time, this dismisses the earlier argument.

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[1] *Psychological Review*, July, 1898.

[2] Professor Münsterberg's attempt at justification (*Psychological Review*, September, 1898) will hardly make clear to the duped teacher (presumably now thoroughly alive to psychological imposture) why one psychologist should be allowed to speak inexactly, 'unphilosophically,' and another not.

[3] *Psychological Review*, November, 1898.

[4] *American Journal of Psychology*, April, 1898, p. 120; cf., also *Philosophical Review*, September, 1898, pp. 449 ff.

[5] 'Psychology and Education.' H. Münsterberg, *Educational Review*, September, 1898. "The student of education . . . can take the whole wisdom of psychology and physiology and remold it into suggestions for the practical teaching attitude," p. 128.

The more serious questions with which we set out still remain; there is, however, additional evidence to be turned in. We shall see how much it helps to determine the vital relation of which we have spoken. There has been for some time a concern among conservative psychologists lest their science should hasten to become utilitarian. Thus Professor Titchener, writing as long ago as 1895,[2] urged that 'the work is its own reward,' and prophesied confusion, if psychology should be pursued "with overt reference to pedagogical application." He continued: "By doing that we cripple psychology; its investigations are not pushed to their ultimate analytic conclusions; and we lay upon pedagogy a burden of immature results, which in the long run will prove heavy indeed to bear. . . . . Psychology will make real progress only so long as her problems are investigated, leisurely and irresponsibly for their own sake." Concerning the means of communication between psychology and education, the same writer more recently suggests[3] that a "middleman" is needed to 'apply' psychology for the teacher. The position, he thinks, belongs naturally to the professor of pedagogy, who should know psychology, and know how to use it for the teacher. A little later a similar opinion was expressed by Professor Royce who pointed out that there is a lack of finality in psychology, and that while psychological problems are *sub judice* they do not furnish material suitable for direct pedagogical application. He proposes the "consulting psychologist" whose function shall be mediatory; he shall be the arbiter of psychological survival in the kingdom of education.[4] Again, Professor Münsterberg advises the establishment of "psycho-educational laboratories" which shall have a similar use. He would make the mediator, the "educational scholar," represent a separate science standing between psychological theory and the teaching profession.[5]

From the point of view of the teacher and educator, the evils of a utilitarian psychology do not appear. Naturally the standpoint is different. The pedagogical profession sees benefit arising to it from the closest coöperation of the psychologist and the teacher. Thus Professor Bliss (*loc. cit.*) writes: "surely no science should fear to be tested by the criterion of the practical." Genetic psychology, especially, he thinks, needs the teacher's contribution. This conclusion is again reached from the philosophical standpoint by J. S.

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[1] "Experimental psychology . . . has conquered the whole realm of psychology." *Ibid.*, p. 132.

[2] *Philosophical Review*, IV, 123.

[3] *Journal of Education*, May 19, 1898, and also issues of June 30th, and October 27th.

[4] *Forum*, September, 1898.

[5] *Educational Review*, September, 1898.

Mackenzie, who suggests that psychology by throwing light upon mental development helps education in a general way to select its methods.[1]

The question is, how reconcile the various standpoints? Perhaps this problem will best work itself out in practice. As a matter of fact, is it not already doing so? There are scores of psychologists whose chief interest is practical: they have one eye always on application. They will not be expected to add much to 'pure science,' but so long as they know their psychology they need not abuse it. They have a very distinct function, and I am not sure that part of it does not lie in keeping a healthy atmosphere within psychology itself. Thus we see how arguments, both general and particular, have crossed and recrossed at various levels of the discussion. We have to ask, in conclusion, whether they further the settlement of the vexed problems which they attack. I am inclined to think that they do, at least they do the pioneer work of clearing the ground. There is now a fuller consensus on the interrelations of psychology and education, and on the proper attitude of each toward the other. The main problem, while not a new one, is assuming new proportions, and probably has a more vital interest to-day than ever before. And the net result? The danger both to psychology and to pedagogy from hasty application of unseasoned results has been repeatedly recognized, and nowhere denied. On the other hand, the sweeping statement that experimental psychology has nothing to offer the teacher turns out to be first a polemic against a 'special theory,' and afterward an opinion on the advisability of a pedagogical system, one of whose duties shall be to grind psychological wheat for the teacher. This is an opinion, I imagine, with which educators generally will be little inclined to quarrel. Whether the 'middleman' will turn out to be the 'psychological educator,' the 'professor of pedagogy,' the 'consulting psychologist,' or some one else, one can only guess at present. Until his advent, I suppose that the intelligent teacher will continue to use what psychology he can command (with the aid of the practical psychologist who has his interest at heart), falling doubtless into errors of interpretation—and this is not his fault, since psychology is not his profession—but withal getting signal aid and inspiration. The psychologist on his side, who has no interest in practice, has surely no call to change his line of march. While he is fighting his own battles there can be small reason for weighting himself with pedagogical impedimenta. The problems of education cannot be settled straightway by the exaggerations of an extremist; the backward swing of the pendulum does not at once bring it to the point of rest, especially if its momentum is augmented by a *deus ex machina* with purposes of his own. Still, the 'mean' is only found after the extremes have been indicated, so that it may perhaps be said that bad exaggerations, like 'bad books,' are of use in pointing out a more perfect way.

I. M. BENTLEY.

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[1] *International Journal of Ethics*, VIII, 4, 423.

## PHILOSOPHY AT THE SCIENTIFIC ASSOCIATIONS.

In a recent address before the Anthropological Section of the American Association for the Advancement of Science, Professor Cattell declared that "from Aristotle to Kant the history of philosophy is in large measure the history of science." The intimate interdependence of philosophical and scientific conceptions in the past, is a fact which must be constantly kept in mind when studying the history of the development of thought. But there is no reason to suppose that this relation ceased after the time of Kant, or that at the present day the paths of philosophy and science lie wide apart. The current use of the terms 'science' and 'philosophy' may easily lead to an over-emphasization of the different kinds and methods of knowledge. In spite of differences of name, however, there is only one *Wissenschaft:* science, not less than philosophy, is the child of wonder, and strives to find unity and system in the world. The increasing integration, as well as the differentiation of knowledge, will, I think, impress anyone who reads the reports of the recent meetings of the British and American Associations for the Advancement of Science.

At the meeting of the British Association at Bristol, the President, Sir W. Crookes, closed an address[1] which contained many points of philosophical interest, with a reference to a belief expressed thirty years ago, "that outside our scientific knowledge there exists a Force exercised by intelligence, differing from the ordinary intelligence common to mortals." "I think," he went on to say, "that I see a little farther now. I have caught glimpses of something like coherence among the strange elusive phenomena; of something like continuity between those unexplained forces and laws already known." Moreover, Sir W. Crookes said, if he were now stating his conclusions for the first time, he would begin "with *telepathy*, with the fundamental law . . . that thoughts and images may be transferred from one mind to another without the agency of the recognized organs of sense—that knowledge may enter the mind without being communicated in any of the hitherto known and recognized ways." He then proceeded to suggest an hypothesis in explanation of this alleged fact. "If telepathy takes place," he says, "we have two physical facts—the physical change in the brain of A, the suggester, and the analogous physical change in the brain of B, the recipient of the suggestion. Between these physical events there must exist a chain of physical causes." The necessary connecting medium the author finds in ether vibrations, which he believes have powers and attributes equal to the demand. "The structure of brain and nerve being similar, it is conceivable that there may be present masses of nerve-coherers in the brain, whose special function it may be to receive impressions brought from without, through the connecting sequence of ether waves of appropriate order of magnitude."

It is at once obvious that very serious objections might be urged against the adequacy of this hypothesis, though it is purely physical in character, and constructed on the analogy of what we already know regarding the transmission of the stimuli for the recognized sense-organs. But no one, it appears to me, will take the theory very seriously until there is better evidence than yet appears of the existence of the facts which it is proposed to explain. The author of the address does nothing more than express his own conviction that such phenomena as he has described actually take place. "Confirmation of telepathic phenomena," he tells us, "is afforded by many converging experiments, and by many spontaneous occurrences only thus intelligible. The most varied proof, perhaps, is drawn from analysis of the sub-conscious workings of the mind, when these, whether by accident or design, are brought into conscious survey." Just how telepathy is to be proved in this way we are not told, and the whole reference to the matter should, perhaps, be taken rather as merely a confession of personal faith on the part of the speaker, than as a presentation of proof for a scientific hypothesis. The truth seems to be that in the investigation of abnormal mentality, there is—if we may judge from the example of those engaged in this field, —an almost irresistible temptation to confuse hypothesis and fact, or to accept principles of explanation which explain nothing, and thus to violate all the conditions to which a logical hypothesis must conform.[1]

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[1] Published in *Science* of Oct. 28, and Nov. 4, 1898.

A paper read before the chemical section of the British Association, by Professor Japp, of Aberdeen, has also awakened much interest, since it has been regarded as an argument for Vitalism. A number of interesting letters attacking the doctrine have appeared in *Nature*, as well as a defense, and what appears like a modification, of the position by the author. We may adopt Professor Karl Pearson's summary of the original argument (*Nature*, September 22d), and also refer briefly to the objections which he raises against it, as well as to Mr. Spencer's letter (*Nature*, October 22d). The substance of Professor Japp's paper is stated in the following propositions: (1) Optically active liquids are due to asymmetrical molecules. (2) These asymmetrical molecules arise from the replacement in a symmetrical molecule of either a right hand or a left-hand atom out of two equal atoms which are images of each other. (3) No optically active substance can be formed unless there be a selection of purely right-handed or purely left-handed atoms, or, at any rate, unless there be a sensible majority of one or the other. (4) Some asymmetric solvents have a power of selective action on optically inactive mixtures of right-handed and left-handed atoms, or, to use the technical term, of two enantiomorphs. (5) No mechanical process (chemical or physical) could select a right-handed as distinguished from a left-handed atom in a symmetrical molecule, and so produce an asymmetric compound. — In replying to this position, Professor Pearson assumes that it only requires a certain *majority* of left- or right-hand enantiomorphs to produce an optically active substance—pointing out that it might be determined by delicate experiments on the rotatory power of mixtures of dextro- and lævo-acids which are mirror images of each other, how great the majority must be. Now, if chance is the factor at work in the production of optically inactive mixtures of right- and left-handed enantiomorphs, in the course of indefinite ages purely mechanical causes must have produced chemical compounds of one-sided asymmetry with various degrees of rotatory power, due to the greater or less frequency of the enantiomorphs. "In nature, where, during countless ages, inorganic actions and reactions must have taken place, the production of chemical compounds of one-sided asymmetry must, on Professor Japp's view of the relation of mechanical action to chance, undoubtedly have taken place." At present, Professor Pearson thinks, we must remain agnostic regarding the possibility of living matter originating from dead matter by a purely mechanical process. Against the alleged inconceivability of the mechanical view, however, he contends that, on Professor Japp's own showing, the inorganic origin of optically active compounds is not only conceivable, but has a degree of probability which might be calculated when we know what is the minimum number of compounds in a physically just sensible solution, and what is the majority of enantiomorphs which will give a just measurable amount of rotatory polarization?

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[1] For some excellent remarks on this subject, as well as for an illustration of scientific methods in this difficult field, see Professor Patrick's paper—"Some Peculiarities of the Secondary Personality"—in *Psychological Review*, Vol. V, pp. 555ff.

Mr. Spencer also criticises Professor Japp's assumption that a mixture of asymmetrical molecules could not be formed without the action of something like a vital force. Professor Japp, Mr. Spencer says, has taken no account of the universal law of segregation, which has been formulated in the second part of the *First Principles.* After formulating this law, Mr. Spencer proceeds: "Now, from this process of segregation it must have happened that when dextro- and lævo-protein were simultaneously formed, the two kinds of molecules, differently related to environing actions (say ethereal undulations alike in nature and direction), separated themselves into groups of their respective kinds." It is true, Mr. Spencer argues, that in consequence of the small differences between the two classes of molecules the minute differential of the forces might be long in producing their effects; and, further, the segregation might be hindered by restraining forces. But slowly or quickly it would surely take place. "And then the molecules of either group would exhibit just that optical activity which Professor Japp, following Pasteur, alleges can only result from molecules formed by vital action." Mr. Spencer goes on to say that neither the physico-chemical nor the vitalistic interpretation of life is adequate, and refers to the recently revised edition of *The Principles of Biology*, in which he has maintained that "the vital principle fails and the physico-chemical theory also fails; the corollary being that in its ultimate nature life is incomprehensible."

Professor W. F. R. Weldon's address as President of Section D (Zoölogy) on 'Natural Selection' (*Nature*, September 22d), deals with difficulties which have been brought against the theory. In discussing variations, the author deals in a very important way with the logic of chance, referring to the work which has already been done in this field by Francis Galton and Karl Pearson. This paper has also called out a number of letters in opposition to its conclusions, which have appeared in recent issues of *Nature*.

When we turn to the account of the Boston meeting of the American Association, as published in *Science*, we likewise find much which is of interest and significance to the student of philosophy. Four addresses delivered by vice-presidents of the different sections are specially worthy of mention. These are: 'Color Vision' (delivered before Section B, Physics), by Professor F. P. Whitman, of Adelbert College (*Science*, Sept. 9th); 'A Half Century of Evolution with Special Reference to the Effects of Geological Changes on Animal Life' (delivered before Section F, Zoölogy), by Professor Packard (*Science*, Aug. 26th, Sept. 2d and 9th, *The American Naturalist*, Sept., 1898); 'The Conception of Species as Affected by Recent Investigations on Fungi' (delivered before Section G, Botany), by Professor W. G. Farlow, of Harvard (*Science*, Sept. 30th, *The American Naturalist*, Sept., 1898); 'The Advance of Psychology' (delivered before Section H, Anthropology), by Professor J. McK. Cattell, of Columbia (*Science*, Oct. 21st). The paper read by Professor H. S. Williams before the Zoölogical Section on 'Variation *versus* Heredity,' is also of special interest at the present time (*The American Naturalist*, Nov., 1898). It is impossible here to present a summary of these papers. Professor Cattell's reference to Parallelism in his address has been noticed by Professor Lloyd in his article in this number of the REVIEW. J. E. C.

The following changes have recently taken place in the philosophical chairs of the German Universities: The vacancy at Kiel, caused by the departure of Professor Riehl for Halle, has been filled by calling Professor Götz Martius, from Bonn. Privat-Docent Dr. Erich Adickes has also been appointed Professor Extraordinarius at Kiel. Professor G. Thiele has been called from Königsberg to Berlin, and has been succeeded by Professor L. Busse, of Rostock. Professor Karl Groos has gone from Giessen to Basel, and Professor P. Hensel has accepted a call to Heidelberg as Professor Ordinarius.

The Welby Prize, offered for the best essay on "The Cause of the Present Obscurity and Confusion in Psychological and Philosophical Terminology," has been awarded to Dr. Ferdinand Tönnies, of Hamburg. The paper will be published in an early number of *Mind*.

Dr. Robert Zimmermann, formerly Professor of Philosophy, died recently at Salzburg. He was regarded as one of the leaders of the Herbartian School.